

You are the chief technician at 2Dcomm, a successful telecommunications company. After a recent blackout, some of your customers are complaining that their mobile phones are experiencing poor reception. As the chief technician, you have been called to the company's main communications tower to investigate.

After talking with some of the customers, you decide to pull out the map which shows the service area covered by your communications tower (the scale is 1 unit= 100 km). You hypothesize that the customer who reported intermittent service are likely located just within the range of the tower. These phones were located at the following points: A(3,4) B(-4,3) C(5,0) D(-3,4).

1. Assuming that the communications tower is located at the origin (0,0), plot the location of the tower and each of the points mentioned above on a new piece of graph paper.
2. Find the distance between the tower and each of these points.
3. Identify and plot three other points where you might expect that customers are experiencing intermittent service.
4. If you were to connect all the positions for a mobile phone that are this same distance away from the tower, what shape would they trace out?
5. What is the distance between the tower (0,0) and any mobile phone located at P(x,y).
6. Your boss has requested that you answer a few questions.
 - a. What is the radius, r , of the tower's service area?
 - b. What is the equation of any circle with a radius of r ?
 - c. What is the equation of a circle with a radius of 5?
 - d. Would a phone at the point (2,4) have full service, intermittent service or no service? How about a phone at (1,4.9)? Prove this mathematically